

Angiographic demonstration of blood supply of right atrial myxoma¹

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A 53-year-old woman underwent cardiac catheterization for assessment of coronary arterial disease. An unexpected finding of a gradient between right atrium and right ventricle led to the discovery of an unsuspected right atrial myxoma. The diagnosis was established by the presence of a filling defect in the right atrial angiogram and by the demonstration of 'tumour vessels' by selective right coronary angiography. Selective coronary angiography can visualize the blood supply to an intracardiac tumour and thus confirm the diagnosis preoperatively.

Angiocardiology is the most definitive method for the diagnosis of intracavitary cardiac tumours (Steinberg *et al.*, 1964; Steiner, 1968). An atrial myxoma will be demonstrated as a filling defect in an atrial angiogram. The distinction must be made between tumour, thrombus, and artefact caused by streaming (Steiner, 1968). The visualization of an abnormal blood supply to the region of the filling defect would support the diagnosis of a filling caused by a tumour. Such 'tumour vessels' have been described (Marshall, Steiner, and Wexler, 1969). To our knowledge this is the first case in which the blood supply to a right atrial myxoma has been demonstrated by selective right coronary arterial injection.

Case report

A 53-year-old woman was admitted to hospital in August 1974 for assessment of angina pectoris. She was well until 1969 when she had a documented anterior wall myocardial infarction. After this infarction she developed disabling typical angina pectoris precipitated by minimal exertion. She was subsequently referred for selective coronary arteriography and consideration for aorto-coronary vein graft bypass surgery. Before that, between 1969 and 1972, she had had several episodes of severe left precordial chest pain with characteristic electrocardiographic abnormalities of pericarditis; she was treated with cortisone and aspirin which provided control of this chest pain.

She also complained of recurrent episodes of rapid

palpitations documented as atrial tachycardia since 1972. These episodes were usually precipitated by mild exertion and excitement, though they occurred occasionally at rest. Relief was obtained by the Valsalva manoeuvre or carotid pressure and the episodes were largely controlled after institution of digitalis therapy. On one occasion, shortly before admission, she had a syncopal episode associated with rapid palpitations and nausea. The duration was a few minutes and there were no recurrences.

She also had four episodes of left hemiparesis and hemianaesthesia lasting one and one-half to three hours over a 10-day interval, one month before admission.

Past history included hypertension for 17 years. The family history was positive for rheumatic fever in both parents and for hypertension in her father.

Physical examination revealed a white 53-year-old woman looking younger than her stated age. The fundi showed grade II hypertensive retinopathy. Examination of the neck and chest was unremarkable. The blood pressure was 160/110 mmHg (21.3/14.6 kPa) in the right arm, supine position. Both 'a' and 'v' waves of the jugular venous pulse were 2 to 3 cm above the sternal angle. Kussmaul's sign was negative. There was a slight sternal lift and a prominent left ventricular impulse with the apical impulse 3 cm lateral to the midclavicular line.

On auscultation the first and second heart sounds were normal. At the apex a fourth heart sound was heard. A presystolic and systolic 'rub' were audible at the lower left sternal border. The remainder of the physical examination was unremarkable.

Cardiac catheterization

Right and left heart catheterization were performed

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percutaneously via the right femoral artery and vein. A second venous catheter was subsequently introduced into the right femoral vein. Pressures were recorded by Satham p23 Db transducers and an Electronics for Medicine Recorder. Right atrial angiograms were performed via a N.I.H. angiocatheter using 50 ml Renografin-76. A left ventriculogram was performed with 50 ml Renografin-76 via the retrograde catheter. Selective coronary angiograms were performed by Judkin's technique.

Results

There was a large apical aneurysm. The remainder of the left ventricle contracted normally.

The left anterior descending artery was totally occluded at its origin. The coronary arteries were otherwise free of obstructive disease.

On withdrawal from right ventricle to right atrium, a pressure gradient was noted. This was confirmed by simultaneous right atrial and right ventricular pressure recordings. The 'a' wave gradient was 14 and the integrated gradient 8 mmHg (1.1 kPa). The right atrial angiogram showed a large filling defect moving back and forth across the tricuspid orifice (Fig. 1). Selective right coronary angiogram indicated clusters of small tortuous

vessels, pooling, and a 'tumour blush' arising from the right coronary artery in the region of the right atrium (Fig. 2a). The repeat selective angiogram, four weeks after operation (Fig. 2b) showed the absence of this abnormal group of vessels.

At operation, the tumour had the typical appearance of a myxoma and this was confirmed histologically.

Discussion

Although uncommon (Heath, 1968), myxomas are important because they represent potentially lethal lesions amenable to surgical cure (Greenwood, 1968; Firor, Aldridge, and Bigelow, 1966). The diagnosis is difficult because of the wide variety of potential manifestations (Greenwood, 1968; Harvey, 1968; Aldridge and Greenwood, 1960). Angiography has been the most reliable diagnostic tool but false positives occur fairly commonly (Steiner, 1968). When a filling defect can be shown, the distinction must be made between tumour, thrombus, and artefact caused by streaming.

Echocardiography has been shown to be useful for confirming the presence of atrial myxoma particularly of the left atrium, but the echocardiographic diagnosis of right atrial myxomas has been described

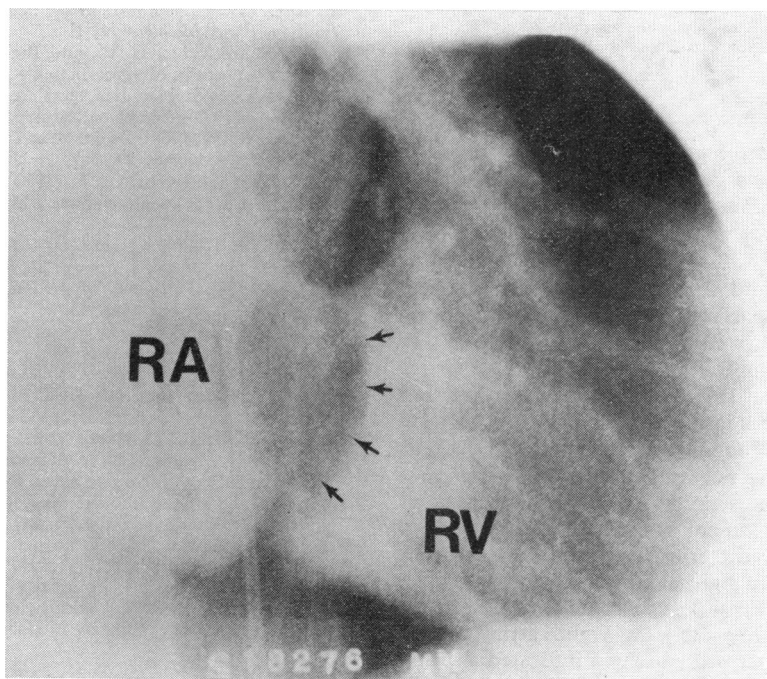


FIG. 1 Right atrial angiogram in 30° right anterior oblique view. Arrows indicate edge of filling defect. RA—right atrium, RV—right ventricle.

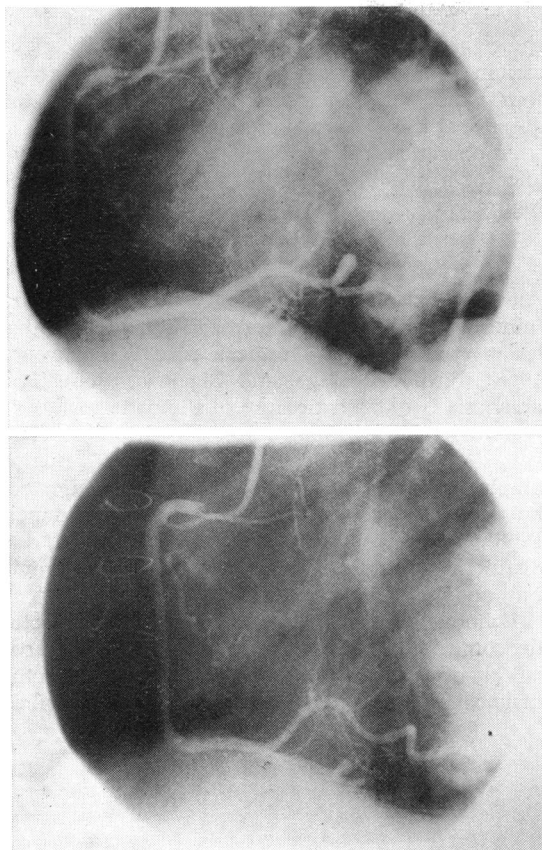


FIG. 2 Selective right coronary angiograms in left anterior oblique projection. a) Preoperative: small tortuous vessels and lacunae can be seen near the bifurcation. b) Postoperative: previously noted abnormal vessels can no longer be seen.

(Wolfe, Popp, and Feigenbaum, 1969; Waxler, Kawai, and Kasparian, 1972; Harbold and Gau, 1973). This appears to require a large tumour that prolapses deeply into the right ventricular cavity (Harbold and Gau, 1973). In this case, even a retrospective echocardiogram failed to demonstrate any abnormality though the anterior leaflet of the tricuspid valve was not well visualized.

The patient presented above was investigated primarily for assessment of coronary artery disease. During routine catheterization, a diastolic gradient was noted between right atrium and right ventricle. To clarify the cause of this gradient (valvular, tumour, thrombus, etc.), a right atrial angiogram was performed which indicated a filling defect moving back and forth through the tricuspid orifice. The suspicion of right atrial myxoma was confirmed when the selective right coronary angio-

gram showed an abnormal group of blood vessels in the region of the defect. The histology of the surgically removed tumour was that of a typical myxoma (Heath, 1968; Hudson, 1965). In view of the vascularity associated with most myxomas, one would anticipate that visualization of this vascularity could be readily performed to aid in the diagnosis. This has been described in a few cases of left atrial myxoma (Marshall *et al.*, 1969; Chan, 1974), but not to our knowledge with right atrial myxoma.

Most patients in whom myxomas have been documented angiographically have not had selective coronary angiograms performed. This case illustrates that a selective coronary angiogram may be useful to confirm the diagnosis of myxoma or other intracardiac tumour and help distinguish between tumour, thrombus, and artefact.

Similarly, most patients having selective coronary angiograms do not have atrial angiocardiograms. If the coronary angiograms show an abnormal group of vessels as documented here, these patients should have further angiography to assess the possible presence of an intracardiac tumour.

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